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JANUARY 1987 NUMBER 221

MONTHLY REPORT

ON THE NUCLEAR FUEL MARKET

NUEXCO

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MONTHLY REPORT ON THE NUCLEAR FUEL MARKET

January 1987 No. 221

R. WESLEY MILLER, *EDITOR* CHARLES B. LEWIS, *ASSISTANT EDITOR*

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To Our Readers

In this Report, Nuexco has made some additions to our *Historical Market Data* section, beginning on page 24. As a service to our subscribers, we have gathered some of the more useful general information on the nuclear fuel market available in a number of different publications. Although available elsewhere, we believe that compiling some of the more interesting statistics in a single format will enhance this section of the Monthly Report. The sources of the information are well-known, and include the Euratom Supply Agency, the US Energy Information Administration, and the OECD Nuclear Energy Agency. We hope you find this data valuable and an interesting addition to the historical Nuexco Market Values.

The graph representation of world production was taken from "Uranium — Resources, Production and Demand," the joint report issued by the OECD Nuclear Energy Agency and the International Atomic Energy Agency. The table listing the average volume and price of natural uranium deliveries to European Community member nations was excerpted from the Euratom Supply Agency Annual Report. The table showing US uranium marketing activity statistics was compiled from various tables in the "Uranium Industry Annual," published by the US Energy Information Administration.

* * *

Nuexco is pleased to announce two acquisitions that will serve to enhance our capabilities for customer service.

1. Our acquisition of Colorado Nuclear Corporation will complement our service capabilities in the area of market information and consulting.

2. Our acquisition of the *International Directory of Nuclear Utilities* will augment our publishing services. Formerly produced and published by Lotte Ltd., of Lakewood, Colorado, the Directory contains the names, addresses, and telephone/telex numbers of utilities operating nuclear plants, as well as names and titles of technical and administrative managers, and other valuable information. The current Directory can be purchased from Nuexco by writing or calling Lori Costarella at our headquarters in Denver, Colorado (303-893-4015).

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NATURAL URANIUM AND SECONDARY MARKET CONVERSION

(All data as of December 31, 1986)

The **Exchange Value** is **$16.75** per pound U_3O_8, unchanged since last month. **Active supply** of natural uranium (concentrates and UF_6) for spot or near-term delivery totals **4,145,000** pounds U_3O_8 equivalent, down 385 thousand pounds since last month. The corresponding figure for **active demand** is **800,000** pounds, up 30 thousand pounds. The spot and near-term **supply-demand ratio** decreased to **5.2:1.**

The *Current Market Data* section of this Report lists one natural uranium sale, involving approximately 100,000 to 300,000 pounds U_3O_8 equivalent. This transaction involved spot or near-term delivery, and met the criteria for inclusion in the current Transaction Value calculation. One loan transaction is reported, involving 100,000 to 300,000 pounds U_3O_8 equivalent.

The **Transaction Value** is **$17.35** per pound U_3O_8, up $0.05 since last month. The calculation extends over a 4-month period and includes 14 transactions involving 2.1 million pounds equivalent U_3O_8.

The **UF_6 Value** is **$47.75** per kilogram U in UF_6, down $0.25 since last month.

The **Conversion Value** is **$1.80** per pound U in UF_6, unchanged since last month. Active supply of secondary market conversion services for delivery within three years totals 750 thousand pounds U as UF_6. Active demand totals 900 thousand pounds U as UF_6. No secondary market conversion transactions are reported.

The **Loan Rate** is **4 percent** per annum, unchanged.

* * *

The Exchange Value remained unchanged at $16.75 as the market showed little activity during December. Only one sales transaction is reported. Demand for natural uranium concentrates remains weak, but increased slightly to 800 thousand pounds equivalent U_3O_8. Supply decreased by nearly 400 thousand pounds during December, causing the supply/demand ratio to decrease slightly, to 5.2:1.

The market for natural UF_6 was largely inactive during December. The UF_6 Value, however, declined slightly to $47.75. The UF_6 market, in particular, continues to show a large spread between the prices buyers are willing to pay, and the prices sellers are willing to accept. Buyers are reluctant to commit to new purchases at this time, and so the discretionary nature of demand is continuing to exert downward pressure on the market.

The most important single factor influencing the market is still the possibility of import restrictions being placed on non-US-origin material, as a consequence of the uncertainties surrounding the US uranium producers vs. DOE lawsuit. By year's end, no ruling had been made by the Tenth Circuit Court of Appeals, but rumors predicting the imminent issuance of such a ruling substantially inhibited both buying and selling during December.

US-origin material currently commands a premium of $0.75 per pound U_3O_8 (up $0.10) in the form of concentrates, and $2.50 per kilogram U in the form of UF_6. Most of the US-origin material sold in the last several months has been made available by means of origin-swap transactions, although there appears to be a decrease in the supply of US-origin uranium available for swap transactions. Asking prices of US producers remain somewhat higher than the Exchange Value, pending a resolution of the producers' lawsuit vs. DOE, which many expect to favor the US uranium industry.

* * *

The Conversion Value was unchanged this month at $1.80, as demand remains thin. The secondary market for conversion services continues to be largely inactive, even though conversion supply has declined and supply has increased. No conversion transactions are reported.

* * *

ENRICHED URANIUM AND SWUS

The **SWU Value** as of December 31, 1986, is $80 per SWU, unchanged since last month. This refers to SWU at a tails assay of 0.30 weight-percent U_{235} and for delivery within one year. The SWU market showed little or no activity during December, with no secondary market SWU transactions being reported.

The SWU market continues to exhibit a fairly wide spread of prices, depending on variables such as origin, delivery and notification dates, whether contract SWU or SWU contained in enriched product, quantities available, and terms of payment. Small quantities of DOE-origin virgin SWUs are still available at prices between $85-100. SWUs contained in enriched product generally are available in larger quantities, at prices near the current SWU value.

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CURRENT MARKET DATA

December 31, 1986	Market Values	Active Supply[1] (thousands)	Active Demand[1] (thousands)
EXCHANGE VALUE	**$16.75**/lb. U_3O_8	4,145	800
UF_6 VALUE	**$47.75**/kgU		
CONVERSION VALUE	**$1.80**/lb. U as UF_6	750	900
SWU VALUE 0.3 tails assay; delivery within one year	**$80**/SWU		
LOAN RATE	**4%**/annum	220	0

	$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
TRANSACTION VALUE	**17.35**	2.1	14	4

[1]Supply and demand tables in *Current Market Data* section of this Report detail the numbers for each category.

DEFINITIONS

1. The **Exchange Value** is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the date indicated.
2. The **UF_6 Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of natural uranium hexafluoride could be concluded as of the date indicated.
3. The **Conversion Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the date indicated.
4. The **SWU Value** represents Nuexco's judgment of the price at which transactions for the sale of significant quantities of SWUs of stated origin for delivery in the specified time period could be concluded as of the date indicated.
5. The **Loan Rate** is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the date indicated.
6. The **Transaction Value** is a weighted average price of recent natural uranium sales transactions. The calculation is based on prices paid in:
   a. Transactions closed within the previous three-month period for which delivery is scheduled within one year of the transaction date;
   b. At least ten transactions;
   c. Transactions involving a sum total of at least 2 million pounds U_3O_8 equivalent.

   The sample time is extended as necessary to include these minima. Other currencies are converted to US dollar using conversion rates in effect on or near the transaction date.

DERIVATIONS AND COMMENTS

1. All Market Values are based on:
   a. Data from recently completed transactions;
   b. Data from pending transactions;
   c. Firm bids to buy or borrow, and firm offers to sell or lend;
   d. Prices purchasers or rates borrowers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy or borrow, and prices sellers or rates lenders have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell or lend.
2. Prices associated with deliveries under old or renegotiated contracts or other than arm's-length transactions are not included in the determination of these Market Values.
3. In the determination of the Conversion Value, Nuexco does not consider transportation charges other than those customarily provided by primary suppliers of conversion services.
4. The prices of conversion services or SWUs delivered under long-term contracts with primary suppliers are not considered in the determination of either the Conversion Value or SWU Value.
5. For the SWU Value, Nuexco converts SWU prices at varying tails and product assays to equivalent SWU prices at a tails assay of 0.30 weight-percent U_{235} and a product assay of 3.0 weight-percent U_{235}, assuming feed costs corresponding to the Nuexco Exchange and Conversion Values determined as of the same date.
6. In calculating the Transaction Value, Nuexco does not account for the price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of future Exchange Values or any other indeterminate variable. Also excluded from the calculation are any other transactions in which the delivery price is defined in such a way that it cannot currently be determined.

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CURRENT MARKET DATA

EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates			per kg. U in Concentrates		
	This Month (Dec 31, 1986)	Last Month (Nov 30, 1986)	12 Months Ago (Dec 31, 1985)	This Month (Dec 31, 1986)	Last Month (Nov 30, 1986)	12 Months Ago (Dec 31, 1985)
Australia (dollar)	25.21	25.85	24.92	65.55	67.20	64.78
Belgium (comm. franc)	678.06	694.16	854.70	1,763	1,805	2,222
Canada (dollar)	23.16	23.22	23.78	60.20	60.36	61.81
EEC (ecu)	15.73	16.16	19.16	40.90	42.02	49.80
Finland (markka)	80.65	82.31	92.19	209.68	213.99	239.68
France (franc)	108.00	108.98	128.40	280.77	283.32	333.81
FRG (mark)	32.58	33.27	41.87	84.70	86.50	108.86
Italy (lira)	22,681	23,116	28,509	58,966	60,097	74,117
Japan (yen)	2,677	2,715	3,413	6,961	7,059	8,873
Netherlands (guilder)	36.85	37.86	47.16	95.81	98.43	122.60
South Africa (rand)	36.81	37.64	43.87	95.71	97.86	114.05
Spain (peseta)	2,219	2,254	2,621	5,768	5,859	6,815
Sweden (krona)	114.10	115.68	128.98	296.64	300.73	335.33
Switzerland (franc)	27.22	27.69	35.31	70.76	71.98	91.79
UK (pound)	11.40	11.75	11.82	29.64	30.55	30.73
US (dollar)	16.75	16.75	17.00	43.55	43.55	44.20

TRANSACTION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates			per kg. U in Concentrates		
	This Month (Dec 31, 1986)	Last Month (Nov 30, 1986)	12 Months Ago (Dec 31, 1985)	This Month (Dec 31, 1986)	Last Month (Nov 30, 1986)	12 Months Ago (Dec 31, 1985)
Australia (dollar)	26.12	26.70	24.26	67.90	69.41	63.07
Belgium (comm. franc)	702.34	716.95	832.08	1,826	1,864	2,163
Canada (dollar)	23.99	23.98	23.15	62.36	62.34	60.18
EEC (ecu)	16.30	16.69	18.65	42.37	43.40	48.49
Finland (markka)	83.54	85.01	89.75	217.19	221.01	233.33
France (franc)	111.86	112.56	125.00	290.82	292.62	324.97
FRG (mark)	33.75	34.37	40.76	87.73	89.34	105.98
Italy (lira)	23,494	23,875	27,754	61,078	62,070	72,155
Japan (yen)	2,773	2,804	3,323	7,210	7,291	8,638
Netherlands (guilder)	38.17	39.10	45.91	99.24	101.66	119.35
South Africa (rand)	38.13	38.88	42.71	99.13	101.07	111.04
Spain (peseta)	2,298	2,328	2,552	5,974	6,052	6,635
Sweden (krona)	118.19	119.48	125.57	307.26	310.61	326.45
Switzerland (franc)	28.19	28.60	34.37	73.30	74.34	89.36
UK (pound)	11.81	12.14	11.51	30.71	31.55	29.92
US (dollar)	17.35	17.30	16.55	45.11	44.98	43.03

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on Dec. 31, 1986.

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CURRENT MARKET DATA

CONVERSION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U as UF_6			per kg. U as UF_6		
	This Month (Dec 31, 1986)	Last Month (Nov 30, 1986)	12 Months Ago (Dec 31, 1985)	This Month (Dec 31, 1986)	Last Month (Nov 30, 1986)	12 Months Ago (Dec 31, 1985)
Australia (dollar)	2.71	2.78	2.35	5.97	6.12	5.17
Belgium (comm. franc)	72.87	74.60	80.44	160.64	164.46	177.34
Canada (dollar)	2.49	2.49	2.24	5.49	5.50	4.93
EEC (ecu)	1.69	1.74	1.80	3.73	3.83	3.98
Finland (markka)	8.67	8.85	8.68	19.11	19.50	19.13
France (franc)	11.61	11.71	12.08	25.59	25.82	26.64
FRG (mark)	3.50	3.58	3.94	7.72	7.88	8.69
Italy (lira)	2,437	2,484	2,683	5,373	5,477	5,915
Japan (yen)	287.72	291.78	321.22	634.32	643.27	708.17
Netherlands (guilder)	3.96	4.07	4.44	8.73	8.97	9.78
South Africa (rand)	3.96	4.04	4.13	8.72	8.92	9.10
Spain (peseta)	238.41	242.20	246.72	525.60	533.95	543.93
Sweden (krona)	12.26	12.43	12.14	27.03	27.41	26.76
Switzerland (franc)	2.93	2.98	3.32	6.45	6.56	7.33
UK (pound)	1.23	1.26	1.11	2.70	2.78	2.45
US (dollar)	1.80	1.80	1.60	3.97	3.97	3.53

SWU VALUE AND UF_6 VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	SWU Value delivery within one year (Dec 31, 1986)	UF_6 Value per kg.U in UF_6 This Month (Dec 31, 1986)	UF_6 Value per kg.U in UF_6 Last Month (Nov 30, 1986)
Australia (dollar)	120.43	71.88	74.07
Belgium (comm. franc)	3,238	1,933	1,989
Canada (dollar)	110.60	66.01	66.53
EEC (ecu)	75.14	44.85	46.32
Finland (markka)	385.21	229.92	235.87
France (franc)	515.80	307.86	312.30
FRG (mark)	155.60	92.87	95.35
Italy (lira)	108,328	64,658	66,243
Japan (yen)	12,788	7,633	7,781
Netherlands (guilder)	176.02	105.06	108.50
South Africa (rand)	175.82	104.94	107.87
Spain (peseta)	10,596	6,325	6,459
Sweden (krona)	544.96	325.27	331.49
Switzerland (franc)	130.00	77.59	79.34
UK (pound)	54.46	32.50	33.67
US (dollar)	80.00	47.75	48.00

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on Dec. 31, 1986.

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RECENT TRANSACTIONS[1]

Uranium Sales

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current Exchange or UF_6 Value	Seller	Buyer	Remarks
3906	1987	101-300	R[2]	Trader	Utility	

Loan Transactions

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current Loan Rate	Lender	Borrower	Remarks
3883	1986	101-300	R[2]	Utility	Trader	Contained in low-enriched uranium

[1]Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.
[2]The notation *R* means that Nuexco either does not know, or that Nuexco has restricted that information to protect client confidentiality.

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CURRENT MARKET DATA

URANIUM SUPPLY
(December 31, 1986)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale:			
ACTIVE			
2335	400	—	
2740	100	—	
2885B	230	—	UF_6
2893A	480	—	UF_6
2933	300	300 per year	1988-90
2967	200	—	
2973	15	—	
2975	250	—	
2989	40	—	
2990	130	—	UF_6
2996*	500	500 per year	1988-90
3023	500	500	UF_6
3121	500	—	
3129	500	500	
2263	—	400 per year	1988 on
2781*	—	750 per year	1988-95
2981	—	600 per year	1988-91
TOTAL:	4,145		
INACTIVE			
2297	200	200 per year	1988-89
2336	250	250 per year	1988-94
2389	75	75 per year	1988-90
2764*	260	—	UF_6
3128	100	—	
2625*	—	500 per year	1988 on
TOTAL:	885		

*New or revised since last month
[1]Measured from the date of this Report
[2]For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts
Projects removed since last month: 2777, 2880, 2922

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URANIUM DEMAND
(December 31, 1986)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Inquiries to Purchase:			
ACTIVE			
2878B*	30	—	UF_6
2956	350	350	U_3O_8 or UF_6
2977	105	—	UF_6
2984	145	—	UF_6
2991	105	—	UF_6
3075	65	—	
2738	—	1,000	1989 on
2962	—	500	1989 on
2985	—	675 per year	1992 on
3097	—	300 per year	1988 on
TOTAL:	800		
INACTIVE			
2760	750	750 per year	1988-90
2798	70	—	
2948	100	—	UF_6
2936	—	400 per year	1988-95
TOTAL:	920		

*New or revised since last month
[1]Measured from the date of this Report
[2]For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 3019

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CURRENT MARKET DATA

LOAN SUPPLY AND DEMAND
(December 31, 1986)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Within 1 Year	Beyond 1 Year	Remarks
Available for Loan:			
ACTIVE			
2861*	220	—	UF$_6$
TOTAL:	220		
INACTIVE			
1938	2,000	—	UF$_6$
2036	500	—	
2920	2,000	—	
TOTAL:	4,500		

*New or revised since last month.
[1]Measured from the date of this Report.
Projects removed since last month: 2667.

No inquiries to borrow are reported this month.

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CONVERSION SUPPLY AND DEMAND
(December 31, 1986)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U as UF_6) Within 3 Years	Beyond 3 Years	Remarks
Available for Sale: ACTIVE			
2859	750	750	
TOTAL:	750		
Available for Sale: INACTIVE			
2988*	165	—	
TOTAL:	165		
Inquiries to Purchase: ACTIVE			
2949	250	—	
2997*	650	—	
TOTAL:	900		
Inquiries to Purchase: INACTIVE			
2833*	400	—	
TOTAL:	400		

*New or revised since last month.
[1]Measured from the date of this Report.
Projects removed since last month: 2935.

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CURRENT MARKET DATA

SWU SUPPLY AND DEMAND
(December 31, 1986)

Nuexco Project Number	Delivery Period[1] (Thousands of SWUs) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale:			
ACTIVE			
2571*	—	55	
3156	70	—	1987
TOTAL:	70		
Inquiries to Purchase:			
ACTIVE			
2987	100	—	1987-88
3015	40	—	
2878*	65	—	1987
2999*	150	—	
TOTAL:	355		
Inquiries to Purchase:			
INACTIVE			
2879	250	—	
TOTAL:	250		

*New or revised since last month
[1]Measured from the date of this Report
[2]For delivery within one year. This category excludes SWUs deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 2855

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ESSAY

THE SOUTH AFRICAN SITUATION

By J. Robert Wolcott
Chairman, Nuexco Concord International
Advisory Committee

Mr. Wolcott, the former Chairman of Nuexco, is now Chairman of the Nuexco-Concord International Advisory Committee. He has followed South African developments for some time; partly because of several visits; partly because of participation in the nuclear fuel industry; and partly because South Africa has been singled out for attention. Sanctions, disinvestments, disengagements, and withdrawals (such as those of Coca Cola, General Motors, IBM, Honeywell, etc.) have been interpreted by some to be "watershed" events. While watershed may, or may not, be an apt description, events do suggest it is an appropriate time for a discussion of the South African situation. Opinions will, of course, differ. Mr. Wolcott's opinions, as outlined in this essay, are mainly set forth to stimulate thought and discussion.

A Divided Society

My first visit to South Africa convinced me it has the world's most complex social, economic, political and military makeup. No other nation has a comparable racial, cultural, ethnic, tribal, and language mix. Subsequent visits only served to reinforce those first impressions. The nation's problems have reached a new, and perhaps, acute stage.

Much more than race is involved. The country is fragmented in many ways. Some disunity and conflict would be unavoidable, even without racial divisions. For example, anthropologists claim language is one of the greatest, if not the greatest, obstacle to political unity and, thus, is most influential in determining national boundaries. Had borders been set wherever languages change, South Africa would be dozens of nations.

South African society has three vertical layers, with divisions within each layer. The result is a pyramid that is segmented vertically and horizontally. The top layer consists of four million whites; the middle layer two million so-called coloreds; and the bottom layer is occupied by the country's 18 million blacks.

The white layer is divided by language and culture. Afrikaners, mainly of Dutch descent, have lived in South Africa for centuries, are strong in farming, politics, and government and tend to maintain a more hard line apartheid policy. English speaking South Africans, mainly of British descent, are strong in mining, industry, and finance and are generally more liberal on apartheid policy.

The middle layer, so-called "coloreds," includes Indians, Chinese, Japanese, and others of lighter color or mixed blood. Indians (mainly descendants of India) comprise the largest group (around 600,000). Coloreds tend to identify more with whites than blacks, although they are neither fully comfortable with, nor accepted by either. Coloreds have neither the numbers nor the means of self-protection as a separate group and could be the most vulnerable in any unstable situation.

The bottom layer, by far the largest, consists of blacks, who for the most part belong to one of more than a dozen major tribes. There are also many small tribes. Over 250,000 are contract workers from a variety of African nations. Another million or so are illegal immigrants. Tribal identities, languages, cultures, and ruling systems may be centuries old. Before identifying as South Africans, members usually identify with tribes (Zulu, Xhosa, Hottentot, etc.). The largest tribe is the Zulu, with a membership of over six million.

Ideology is an increasingly divisive influence. Bishop Tutu "hates capitalism," favors sanctions, but looks to the West for support. The African National Congress (ANC), a rebel Marxist-led group, wants black control, nationalization of major industries, a multi-racial society and is backed by the Soviet Union. The Zulu, Chief Buthelezi, a moderate, opposes apartheid, opposes sanctions, and believes in gradualism and cooperation with whites and the West. The main white opposition party, the Progressive Federal Party (which holds 26 of 166 seats in Parliament), opposes apartheid, opposes sanctions, and is unable to agree on the role whites and minorities should play when apartheid is abolished.

Strategic Considerations

Four conditions make South Africa one of the world's most strategically important countries. They are (a) geography, (b) physical resources, (c) role in the comprehensive southern African economic and industrial system, and (d) trained talented people.

South Africa's geography provides the key to control of one of the world's most important shipping lanes. Every year 25,000 ships pass the Cape of Good Hope; a large fraction stop at South African ports, partly to pick up and leave shipments for African nations to the north of South Africa; and about one-third are oil tankers supplying Europe and Japan. One can readily appreciate the power associated with such a geographical position.

South Africa is uncommonly rich in strategic materials. It is the second largest producer, after the USSR, of manganese; leading producer of platinum; second largest producer of chrome, after the USSR; and a major producer of gold, diamonds, coal, uranium, iron ore, vanadium, nickel, tin, lead, and other vital resources. Together, the Soviet Union and South

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Africa virtually control the world's supplies of chrome, platinum, and vanadium. They are also the major producers of some others, such as gold. New mineral "OPEC's" could arise if the control of South Africa's resources changed hands.

South Africa, with less than 10% of the African population, produces 40% of the GNP. Not only is South Africa the only African nation self-sufficient in food supply, but it is also an exporter. White living standards are comparable to those in the West. Black economic levels are three times the average of sub-Sahara African nations. Environmental and ecological preservation far surpasses the balance of Africa where animals, grazing land, and farm land are increasingly endangered. Education and training are well above averages for the rest of the continent. Africa needs those human resources — both for South Africa, and for the benefit of the balance of Africa as well.

South Africa is the economic hub of the whole of Southern Africa. Most countries near South Africa are landlocked and depend heavily upon South African transportation, communication, markets, technology, and capital. Without a viable South African economy, all of southern Africa cannot have a viable economy.

Government Policies

Government strategies and policies will be decisive in determining South Africa's future, but it is not clear which government policies will be decisive. Self-interests are varied and policies conflict in many ways. The most important government policies are those of South Africa itself, the two superpowers, and neighboring nations, such as Namibia, Botswana, Zimbabwe, Lesotho, Angola, and Mozambique.

South Africa — The South African government's ineptitude makes it difficult for even those sympathetic to its complexities. Figuratively speaking, the Botha government shoots itself in the foot at every opportunity. But governmental clumsiness cannot be allowed to obscure the need for policies based more on reason than emotion.

The South African government has two fundamental, interrelated problems. The first is that voting rights are limited by race. Only whites, a 16% minority within the total population, are eligible to vote. That eligibility for the vote is determined by race highlights injustice in a way that other voting limitations do not. That violation of democratic principles is probably not the basis for much of the criticism being leveled at South Africa (except, perhaps, in the United States). At least three-quarters of the world is less democratic. Many of those criticizing South Africa, especially other African nations, cannot argue the case for increased democracy without undermining the legitimacy of their own governments.

Enlarging voting eligibility is not a simple act with predictable consequences. Implementation of the one man, one vote principle would be an enormous threat to the existing power structure in South Africa. White voters would be outnumbered by four or five to one. Drastic, unpredictable changes would have to be expected. Whites' desire for gradualism is understandable.

The second fundamental problem is apartheid — that is, separation of living areas, public accommodations, compensation standards, job and professional opportunities, and so on, by race. Although the system has not been dismantled, it has been improved. "Petty apartheid," has gradually declined. More mixing in hotels and other public places is evident. Gradual abolition of separation appears to be the course, although the pace is too slow to please African nations, western critics, or South Africa's black majority.

My own view is that the South African government would move more rapidly in directions promoted by the West if it knew how to do so with a reasonable certainty of a controllable outcome. Neither the West, nor others, have been helpful with practical solutions. Rather, the West has been more than helpful in supplying criticism. The South African government does manifest an unfortunate amount of belligerent intransigence. However, their reaction is somewhat understandable, because the problem is serious and the stakes are high.

The United States — United States foreign policy has become almost the exact opposite of the founding fathers' original intent to "avoid all entangling alliances." For many years, the internal affairs of a nation were viewed as the exclusive business of that nation. That policy gradually eroded as stability and security of strategically-situated nations and regions affected the superpowers' national security.

Concern with other nations' internal affairs became a centerpiece of US foreign policy under the Carter administration. US policies and relationships with other governments were, in theory, to be shaped by their performance on human rights issues. Because human rights vary with circumstances, no objective standards can be applied. For example, the recent US law imposing sanctions against South Africa requires an evaluation by the US government of conditions for blacks in South Africa, but not blacks in the balance of Africa where economic and material conditions are often worse. Uneven degrees of strategic importance from nation to nation makes the application of policy uneven.

By focusing on the human rights issue we allow the issue of South Africa's strategic importance to be subordinated. But by taking upon ourselves the responsibility for a problem for which we cannot provide a suitable solution, we sow the seeds of our own frustration. The result is what I call "a policy of frustration."

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The Soviet Union — It would be unreasonable to blame the Soviet Union for South African strife, even though it contributes. Sovietologists point out that Soviet superpower status depends totally upon military strength. The Soviet brand of communism is no longer generally accepted as a model for either economic development or social justice; nor do technology, culture, or consumer products provide distinction for leadership. Potential Soviet contributions to a regime consist of (a) military support, and (b) knowledge of methods by which to seize and hold power. The Soviet Union excels in those areas, and those skills are appreciated by a number of African nations.

The USSR is perceived as experiencing internal decline. Mr. Gorbachev lends credibility to this with his public programs. It is sometimes argued that concern with internal problems, mainly those having to do with the economy, will lessen the Soviet Union's external expansion and that South Africa may not be pressured.

That is unlikely. History demonstrates that empires continue to expand long after internal decline is recognized. Moreover, considering the strategic importance of southern Africa, even if resource limitations were to reduce the Soviet Union's external involvements, it would be much more likely to abandon less important targets than to forego the opportunity to interfere in South Africa.

Other African Nations — The nations most important to South Africa are those on or near its border. Conversely, South Africa is the nation most important to Namibia, Zimbabwe, Botswana, Mozambique, Lesotho, Angola, and others.

Southern Africa is an interlocked economic system. Most of the aforementioned nations are landlocked and underdeveloped, and depend upon the South African infrastructure for shipping and communications. Many of them also depend upon South Africa for financing, technology, and management skills.

Leaders of several of those nations have expressed willingness to accept the consequences of opposing South Africa's government (while also requesting US aid to compensate for resulting economic losses). However, it is doubtful they have fully considered the likely impact upon their own nations. The economic viability of southern Africa depends extensively upon the viability of South Africa. And that depends on its social and political viability.

South Africa's border is long and vulnerable, particularly to the Marxist nations of Zimbabwe and Mozambique. Mozambique accommodates the rebel African National Congress (ANC), while South Africa supports rebels opposing the government of Mozambique. Zimbabwe is sympathetic to virtually all anti-South African rebels. To the north of Namibia and Botswana, the Soviets and Cubans are active in Angola. Southern Africa would be a politically explosive region, even without the special problems of South Africa.

Zimbabwe, formerly Rhodesia, made the transition from white rule to black in the late 1970's. One would expect Zimbabwe to be promoted as a model, but that has not been the case in the West. The differences between Zimbabwe and South Africa include a smaller population, smaller percentage of whites, and less difficult tribal conditions, but there are also similarities.

Zimbabwe is not highlighted as a model, no doubt because results have not been as the West would prefer. The largest tribe dominated elections. Minority tribes were violently suppressed. Western nations provided assistance. The few whites retained in government gradually declined in numbers and influence. The prime minister, Robert Mugabe, announced a one-party Marxist system and "everlasting friendship" with the Soviet Union. The West, particularly the United States, is continuously criticized and insulted, so much that 20 million dollars of United States foreign aid recently was suspended. Even former President Carter walked out of a Third World meeting to which he had been invited.

Much of Zimbabwe's industry has been nationalized. Inflation and unemployment are high. Foreign investment is low. East Europeans filled high-salaried, skilled positions vacated by emigrating Rhodesian whites. Amnesty International has been barred for reporting human rights violations. Providing information to Amnesty International has been made a crime.

The Morality Issue

Many people espousing anti-South Africa policies assume that moral superiority is inherent in the imposition of enforced isolation and punitive actions damaging to the nation's economy and to national pride. A further underlying assumption is that South Africa's government can be punished without undue damage to individuals, and even if that is not the case, blacks are prepared to accept the price.

Anti-apartheid movements generally focus narrowly on the issue of black versus white. They take the attitude that all other considerations are almost irrelevant. That reasonable men need not be concerned about anything else at this point. That only when the evil of apartheid is gone will a just society be possible. That any deviation from that way of thinking equates to discrimination. Some even use "destroying society to save it" as a rationale for their actions. In such an atmosphere, news media coverage inevitably becomes unbalanced. One death from violence in South Africa receives more coverage than 100 deaths from deliberate starvation in Ethiopia. South Africa receives more media attention, by far, than the entire balance of Africa, even though millions are currently starving and a dozen or more wars are in progress.

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ESSAY

The general climate is not one which makes rational approaches easy to suggest or to gain acceptability. Rational solutions require recognizing that apartheid is not only there, in place and functioning, but that it is the linchpin around which a society of 25 million people is organized. Being an unfortunate linchpin does not alter reality. The linchpin of any organization cannot be changed easily and should not be changed blindly. The alternatives need to be known.

Concern for all those who actually live in South Africa must be the first priority. The United States, Western Europe, African nations, the Soviet Union, and other outsiders will not have to live with the end results; South Africans must. It is not clear whether what is promulgated by outsiders is to satisfy their interests, or genuinely reflects the true interests of South Africans. We have no accurate polls reporting the full spectrum of their views. The risk is high that the views of the black rank and file are not well understood, and that those of whites and coloreds are simply ignored.

While there is widespread agreement on the desirability of eliminating discrimination, there is little agreement on how to do it (Chief Buthelezi's concern). Nor, most importantly, is there agreement on the political ideology that would shape the post-apartheid era. The United States may know what would please it most; The Soviet Union may know what would please it most; African critics may know what would please them. And South Africans, as a whole, are not of one mind. The multitude of interests do not coincide. A power vacuum is a genuine threat and how it might be filled will be critical.

In short, a moral course requires knowing the goal, the nature of change required to achieve the goal, and a clear vision of how that change will be accomplished. I do not believe anyone, including the United States Congress, can claim moral superiority, until it is known not only what one is for, but what one is against.

Challenges and Responses

South Africa has all the conflicting elements of race, religion, class status, and language, any one of which has set off wars in other places. Henry Kissinger has commented that the potential danger is a situation where everyone ends up fighting everyone, as in Lebanon. Governing South Africa with its many contradictions would be a major challenge under the best of conditions.

Orderly change requires the reasonable continuity of a central government. Without a center of power, the expected results will be chaos. A power vacuum would unleash internal forces, as well as external forces, and could result in anarchy. Chaos would, of course, provide opportunity for foreign intervention. Cubans are nearby. The United States, on the other hand, may have locked itself into a position of impotence. The US public will not support black, Marxist groups, nor will they support white-led forces appearing to support apartheid.

The US Congress has decided that "constructive engagement," as espoused by the Reagan Administration, is a failed policy. A more activist policy involving punitive measures, namely sanctions, is preferred at this point. The effects of sanctions go well beyond legal requirements. The combined effect of South Africa's problems — US government opposition and public opposition — is just too difficult for many US companies. Some have left, and others will follow. Unfortunately from the South African point of view, they certainly will not return before an acceptable solution has been achieved.

Congress is caught up in the need to oppose apartheid to the exclusion of all else, to "be on the right side of history," "to strike a blow for democracy," etc. Consequences, alternatives and the longer view are not considered thoroughly. Slogans are substituted for objectives. The United States is pursuing a mindless policy of frustration, rather than a constructive policy of solution.

The Uranium Situation

South Africa produces about 13% of the world's uranium. Namibia, under South Africa control and included in sanctions, contributes another 10%. World resources are ample for the replacement of all South African supplies. Prices might rise, but that effect would be minimal, and the loss of South African potential supply is not a grave threat.

Uranium business decisions to be made in South Africa will have major impact. For example, a decision to dispose quickly of the 20 to 30 million pounds of inventory at whatever price is attainable would drop the market. If long-term contracts are not renewed and output continues unabated (a likely outcome, as most South African uranium is a by-product of gold production), and if that were sold on the spot market, the impact would be great. Many scenarios are conceivable and most are not too comforting to suppliers in an international market.

Because of the "siege mentality" in South Africa, there has long been a tendency to believe that problems can be overcome by sheer willpower. With certain products which may be traded with little difficulty, such as gold, that may work for a time. On the other hand, uranium is highly controlled. Origin is an important factor. Sooner or later, South Africans must appreciate the complex commercial world in which they now live. Additional commercial assistance will be needed. What form that may take is yet to be determined.

Summary and Conclusions

As severe and unfortunate as its problems may be, South Africa is not the villian it is made to appear. The South African government's handling of sensitive human issues is clumsy, but

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easy solutions are not evident. The mindless punitive policies now being employed by opponents are most likely to lead from the current situation, in which blacks have no political influence under a white-controlled government, to a future situation in which blacks, coloreds, and whites have no political influence under a black totalitarian government.

To change South African society in a positive direction, promising equality, dignity, and political participation, requires much more than merely eliminating discrimination. It requires a comprehensive vision of a magnitude that I am not aware exists inside or outside South Africa.

The probability of successful results is much greater if the nation's substantial internal social and political pressures are allowed to resolve themselves. That does not guarantee success, but allows those who must live with the results to be responsible for the final outcome. Outsiders, such as the United States, can add only problems without solutions. The West and South Africa need stability, while the Marxists need instability to aid their efforts to usurp control. Too much outside influence may very well facilitate the attainment of their objectives.

A number of American companies have withdrawn and more will follow. The reasons, ultimately, are economic ones. The market is small; profitability is small; the long-term outlook is risky; and public relation problems are large. Disproportionate management time, energy, and resources are absorbed. Few, if any, believe their leaving will contribute to solving apartheid, but rather, they believe the opposite. None will return before a satisfactory solution is achieved, if ever.

United States sanctions do put pressure on South African businesses; they will reduce exports and imports; they will decrease profits; they will hasten the departure of international companies; they will increase unemployment. They will also help radicalize negotiating positions, and we do not know the ultimate result. Results of economic disengagement are not yet known. Hardships resulting from companies' disengagement are beginning to gain modest media attention. Their view of the relative advantages and disadvantages may change with time. There is good reason for companies to wait before joining the movement toward disengagement.

As time goes on, the West may be confronted with what the Soviet political lexicon calls "an objective correlation of forces," which means revolution and communist dictatorship. By the time we know more about the eventual outcome in South Africa, the West may have painted itself into a corner ensuring a power vacuum that would naturally be filled by the Soviet Union.

Current problems in South Africa are viewed as caused by their government, but government also must provide the solution. An orderly system is not possible without government. Weakening government by the various devices now being used in the world decreases the government's ability to deal with its problems, and thereby increases the likelihood of chaos.

I am not totally pessimistic. A middle ground may evolve. The South African government must recognize that indefinite survival is not possible without a base of support from the country's black and colored citizens. Blacks must appreciate the potential consequences of a breakdown in law and order. Coloreds must appreciate the precariousness of their in-between situation. Border nations must appreciate the economic and military risks of an unstable South Africa and the threat of outside domination. Although things may get worse before they get better, a number of rational forces do reinforce one another. Whether they will prevail against the combined forces of the many irrational influences will not be decided soon.

Strategy Recommendations for Market Participants

1. Operate within the constraints of national and international laws.

2. Continue, insofar as possible, business relationships as in the past, and search for new opportunities.

3. Do not feel a moral need to go beyond the actual requirements of the law in dealing with South African matters. Do not use "moral superiority" as a basis to support sanctions and disengagement. Try to take a more long-term, balanced view.

4. Do not invest in South Africa. Do not recommend investment by clients. Both for economic reasons. Risk is high. Prospects for stability and profit do not justify the risk.

5. Keep informed about the numerous constraints which affect commerce in uranium of South African or Namibian origin.

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RECENT DEVELOPMENTS

UNITED STATES

Following the release in November of the EIA report "Domestic Uranium Mining and Milling Industry: 1985 Viability Assessment," Secretary of Energy John Herrington has officially declared the uranium mining and milling industry in the US not viable for 1985 (see Report 220, December 1986, page 18 for a summary of the EIA report's findings). This is the second consecutive year that DOE has issued a non-viability determination for the US uranium industry, after finding it viable for 1983, the first year of a viability assessment.

The four key attributes of viability used in the EIA study assume that a viable domestic uranium industry is one that can meet domestic requirements, under a variety of scenarios such as a disruption of import supplies, for a future ten-year period. These attributes are:

1. Resource Capability — the ability of domestic economic uranium reserves to supply all domestic needs for a future ten-year period. Analyzing this attribute, EIA found that according to its projections, domestic uranium supply security requirements would be met by US producers through 1996.

2. Supply Response Capability — whether US uranium production capacity is adequate to meet projected domestic nuclear power requirements for a ten-year period. This attribute considers supply capability as the maximum projected uranium production capacity, limited only by technical and engineering constraints on development of facilities once a hypothetical disruption has begun. EIA found that under its "current disruption status" scenario, which assumes a near-term, one-third import supply disruption, the US industry capacity is sufficient to meet requirements. However, under the "projected disruption" scenario, assuming a one-third import supply disruption starting in 1991, the projected maximum domestic production capacity would fall short of cumulative requirements by about five million pounds U_3O_8.

3. Financial Capability — the US uranium industry's ability to obtain the financing necessary to operate production facilities at the level of supply defined under Supply Response Capability. The EIA report found that "nearly all current and expected short-term indicators of the domestic uranium industry's condition are weak in relation to those of recent times." Production is at its lowest level since 1956; investment in domestic uranium exploration, mining, and milling is at the lowest level since 1973, when the US Government began collecting those statistics; the industry experienced losses of over $650 million during 1984-1985; and recent contract prices are much lower than production costs of the great majority of US uranium deposits. Overall, the report found that domestic production capacity could meet requirements under the "current", that is near-term, disruption scenario, but that it would be inadequate during the first two years of the "projected" disruption scenario.

4. Import Commitment Dependency — whether, for any two consecutive year period, actual or projected US uranium requirements will result in over 37.5 percent being supplied by non-US origin uranium currently under contract or option. EIA reports that imports exceeded this percentage in 1982 and 1984, but fell to 34 percent in 1985. Even so, the report noted that non-US origin uranium is "likely to fill a growing portion of currently unfilled utility requirements and long-term utility purchase commitments with domestic suppliers during the second half of this decade." Mean projected values for imports range from 45 to 60 percent of domestic utility requirements throughout the 1990s, according to the report. None of the findings of the Assessment report is meant to be taken in isolation, but rather used together to form a determination of viability or non-viability. However, given the conclusions reached by the EIA report, it would have been difficult for Secretary Herrington to determine the US uranium industry to be anything other than non-viable.

* * *

The US Energy Information Administration (EIA) has released its comprehensive study of the US uranium industry, entitled "Uranium Industry Annual 1985." The study provides current statistical data on the US uranium production industry, for use by Congress and federal and state agencies, the uranium and utility industry, and the general public. The report utilizes data obtained in the EIA's annual survey of the US uranium industry. The survey was first used to collect data for calendar year 1984, and the subsequent report replaced several earlier DOE/EIA publications.

Publication of the 1985 Industry Annual came shortly after EIA released a separate study used to determine the viability of the US uranium industry. The Uranium Industry Annual, however, contains a more comprehensive review of the US uranium production sector. The principal findings of the EIA survey are summarized under two general sections — Uranium Raw Materials Activities and Uranium Marketing Activity.

Raw Materials Activities

The information contained in this section of the report ranges from US producers' efforts in exploration, development, drilling, and mine and mill production, and includes data concerning uranium resources and economic reserves. Some of the more illustrative statistics are summarized as follows.

1. US uranium production in 1985 amounted to 11.3 million pounds U_3O_8, down from 14.9 million pounds in 1984. Of the 11.3 million pounds produced in 1985, conventional milling methods yielded 6.1 million pounds. Other methods, chiefly *in*

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situ leaching and by-product recovery from phosphate mining in Florida and Louisiana produced 5.2 million pounds. Although there has been some decline in production of U_3O_8 by nonconventional methods since 1981, the decline in conventional production in the last five years has been much more pronounced.

Consequently, nonconventional sources play an increasingly important role in US uranium production, amounting to 46 percent of the total.

2. The states of Wyoming, Texas, and New Mexico accounted for about 53 percent of the total domestic uranium production in 1985. In addition, approximately 80 percent of the economic reserves reported were from uranium deposits located in those three states.

3. Thirty companies reported that they participated in exploration activities in the USA, completing a total of 1.8 million feet of surface drilling. By comparison, 43 companies completed a total of 2.6 million feet of surface drilling in 1984. This typifies a decline in drilling that has been underway since 1979.

4. Total exploration and development expenditures fell to $20.1 million in 1985, a 24-percent decline from the 1984 figure.

Marketing Activity

The information contained in this chapter of the report deals with quantities and average prices of uranium deliveries in the USA, inventories, secondary market commitments, and other marketing data.

1. The reported average contract price of uranium delivered to US utilities from domestic suppliers in 1985, including spot market contracts, was $31.43 per pound U_3O_8, stated in year-of-delivery dollars. For 1984 deliveries, that average price was $32.65 per pound.

2. The weighted average price for 1985 deliveries *under contracts signed in 1985* was $15.13 per pound U_3O_8. During 1985, the Nuexco Exchange Value averaged $15.60.

3. US utilities imported 11.7 million pounds U_3O_8 equivalent in 1985. The average price of those imports was $20.08 per pound U_3O_8, down from an average of $21.86 per pound in 1984.

4. The inventory level of uranium held by US utilities diminished slightly during 1985. From 160.2 million pounds U_3O_8 equivalent held at the end of 1984, the inventory level decreased to 153.8 million pounds U_3O_8 equivalent in 1985, roughly a six-year forward supply.

5. Secondary market transactions in 1985 resulted in the exchange of some 13.6 million pounds of U_3O_8 equivalent, slightly higher than the 12.3 million pounds reported for 1984.

6. Domestic suppliers reported that at the end of 1985, 237.2 million pounds of uncommitted U_3O_8 was available for sale in the 1986 to 1995 period. However, that estimate assumes unlimited prices would be available. At prices of $40 per pound U_3O_8 or less, three-fourths of that figure, or 184.8 million pounds, were available for sale in that time period.

* * *

On Thursday, December 18, 1986, the Nuclear Regulatory Commission (NRC) suspended its general import licenses as they apply to South African and Namibian uranium, irrespective of form. Beginning January 1, 1987, importers of South African material must apply for and be granted a special NRC license before their South African material is allowed to be brought into the USA. The NRC action comes before the issuance of implementation rules by the Treasury Department, which oversees the US Customs Service, concerning the issue of whether uranium destined for reexport will be included under the South Africa sanctions bill, and whether uranium "oxides" only will be covered by the sanctions. In the event that Treasury rules to ban only uranium oxides, therefore permitting South African UF_6 to be imported, the NRC could restore its general import licenses for these products.

CORRECTION

Last month's Conversion Values Expressed in Selected Producer and Consumer Currencies (No. 220, December, 1986) mistakenly cited the ECU figure for November 30, 1985 as 4.80. This number should have been 4.07 (ECU).

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FOCUS

THE NUCLEAR WASTE POLICY ACT of 1982

Introduction

The Nuclear Waste Policy Act of 1982 (NWPA) addresses, within a comprehensive legal structure, serious problems of radioactive waste disposal in the USA. Nuclear power reactor by-products such as spent fuel rods and contaminated equipment are of primary concern, but the Act also deals with wastes resulting from medical and defense applications. In regard to the nuclear power industry, the Act chiefly covers disposal of high-level waste products, but also contains provisions for such aspects of nuclear policy as transportation of nuclear waste, research and development of interim storage technology, and funding of the waste plan.

Recent decisions by DOE to postpone the selection of a second repository site for high-level waste have brought the NWPA to public attention as political campaigns and congressional rhetoric focus on its implementation. During the next session of Congress, convening in January 1987, the NWPA is likely to be the subject of close examination, and substantial modification of the legislation is a possibility.

Background

Because spent fuel contains fissionable materials, the US commercial nuclear industry originally planned for the reprocessing of spent fuel elements from reactors. In the early years of commercial nuclear power, a reprocessing industry was expected to grow parallel to the growing number of commercial reactors. On that assumption, on-site spent fuel storage facilities were designed to hold only a few years worth of spent fuel elements, which typically require several years of cooling in water ponds before reprocessing can be performed. From 1967 to 1972, Nuclear Fuel Services Inc. (NFS) provided commercial reprocessing at its plant in West Valley, New York. In addition, General Electric (GE) built a reprocessing plant at Morris, Illinois, but technical problems prevented its operation. A third plant, built by Allied-General Nuclear Services (AGNS) at Barnwell, South Carolina, was completed but neither licensed nor operated.

The focus of storage and disposal of spent fuel from nuclear reactors changed considerably in the late 1970s. In April 1977, President Carter announced that commercial reprocessing of spent nuclear fuel would be postponed indefinitely. The primary reason stated for this decision was the threat of nuclear weapons proliferation from the increased handling and production of plutonium. Even though there were no commercial reprocessing facilities operating in the USA at the time of the government's announcement, the existence of reprocessing technology had enabled utilities having nuclear plants to defer long-term planning for the storage and disposal of spent fuel elements and other high-level waste materials. Moreover, the government had been able to avoid the issue of permanent disposal of highly radioactive materials.

President Carter's announcement banning reprocessing forced utilities to reconsider their options for long-term storage of spent fuel elements. Many have since modified their spent fuel storage pools to accept redesigned racks that allow denser packing of fuel elements, in some cases almost doubling storage capacity from that originally designed. However, the pool structure's inability to support the much greater weight of extra fuel elements has meant that some utilities could not make use of these redesigned racks. In some cases, spent fuel bundles have been transported to other facilities within the same utility, or to other plant sites where storage space was still available. The GE reprocessing plant has also accepted small amounts of spent fuel for storage. Nevertheless, storage capacity is approaching its limits. DOE projects that the accumulation of spent fuel will exceed 40,000 MTU by the year 2000.

The Nuclear Waste Policy Act

The Nuclear Waste Policy Act was signed into law in 1982 by President Reagan. Primary responsibility for the Act's implementation rests with DOE, but both the Nuclear Regulatory Commission (NRC) and the Environmental Protection Agency (EPA) are given interlocking roles in designing and implementing the necessary licensing and regulatory procedures. The NWPA legislation covers virtually every aspect of high-level waste disposal, including the exploration of alternate technologies for short-term storage, fee structures for utilities' contribution to a waste fund, transportation practices, and mechanisms for local government and public approval.

The rationale behind the NWPA was to ensure permanent disposal of high-level nuclear waste in a deep geologic repository. The Act calls for the federal government, under the auspices of the Department of Energy (DOE), to begin accepting spent nuclear fuel for disposal by January 31, 1998. Until that time, however, utilities must be responsible for storing their spent fuel. As part of the NWPA, an interim storage facility, the Monitored Retrievable Storage (MRS) facility, is also being considered for spent fuel and other wastes which would ultimately be contained in a permanent site.

The engineering and technical aspects involved in selecting and constructing a geologic repository are integral parts of the repository program. However, there are some fundamental political issues that must be resolved before the process of site selection and licensing can be carried out. The NWPA mandates

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specific ways to address these issues, which have prompted the filing of a number of lawsuits in opposition to the NWPA approach to waste disposal. In addition, the waste policy was an important issue in many state and local elections in November, especially in states closely involved with potential site selection.

The NWPA defines a process of several stages before any construction can be started. In the first stage DOE is required to:

1. Develop and issue siting guidelines.

2. Identify a number of potentially acceptable repository sites.

3. Nominate at least five sites for detailed characterization as candidate sites. Before nomination, DOE must notify the governor and state legislature in the candidate state, and must hold public hearings in the vicinity of each site.

4. Provide an environmental assessment (EA) of each nominated site.

5. Recommend to the president three of the five candidate sites for site characterization.

While this first stage is in progress, the NWPA also requires the EPA to develop and issue environmental standards applicable to a repository, and requires the NRC to develop and issue regulations for licensing a repository. After the DOE's initial selection and recommendation of three sites to the president, several steps must be taken.

1. The president must, within 60 days of receiving the secretary's recommendation, review each candidate site plan and either approve or disapprove the site, or invoke his authority to delay for not more than six months his decision to approve or disapprove. Following approval, notification is given to the governor of the affected state or to the governing body of the affected Indian tribe, if applicable.

2. After site approvals by the president, DOE proceeds with site characterization, based on detailed site characterization plans issued by DOE.

3. Following site characterization, expected to take several years, DOE prepares an Environmental Impact Statement (EIS) to comply with EPA regulations. DOE then recommends approval of one site to the president.

4. Presidential approval, if granted, then is forwarded as a recommendation to Congress. Again, the governor of the affected state or governing body of any affected Indian tribe must be notified. The state or Indian tribe may at this point submit a notice of disapproval, which can prevent use of the site unless the disapproval is overridden by a joint resolution of Congress.

After the various stages of approval are completed, final approval for construction can begin.

1. Following congressional and presidential approval, the DOE applies to the NRC for authorization to begin construction. NRC must then hold additional public hearings.

2. If the NRC grants authorization, construction may begin. After construction is complete, DOE applies to the NRC for a license to operate the repository.

Site Selection

The controversy over selection of potential sites for the primary and secondary high-level waste repositories has focused public and political awareness on the high-level waste issue. In December 1984, draft environmental assessments were issued by DOE for nine potential first repository sites in six states. DOE then recommended Hanford, Washington; Yucca Mountain, Nevada; and a site in Deaf Smith County, Texas as the three candidates for site characterization. Ranked after those were two other sites — Richton Dome in Mississippi and Davis Canyon in Utah. The three recommended sites represent a desirable diversity of rock types. The Hanford, Washington site is composed of basaltic rock; the Yucca Mountain, Nevada site is composed of volcanic tuff; and the Deaf Smith County, Texas site is a salt formation. In May, 1986, President Reagan formally approved DOE's three recommended sites, allowing DOE to begin the site characterization phase.

Since mid-summer 1986, there has been an ongoing controversy over the process and methodology used by DOE to select the sites recommended for the first repository. This controversy has also been stimulated by DOE's decision to discontinue site selection work on the second repository program. In general, site selection has become increasingly politicized, with charges being made that DOE's selection process has been greatly influenced by political concerns during the recent election, and by political maneuvering during the initial stages of the process.

Site Characterization

In the site characterization phase of the repository selection process, the NWPA requires DOE to undertake an extensive preparatory program at the three nominated and approved sites, in Washington, Nevada, and Texas. This process is expected to take at least five years and cost over $1 billion per site. Site characterization examines in detail the geologic, meteorological, geochemical, seismic, and other conditions in order to fully describe the site. On the basis of these scientific results, preliminary designs are created for a repository, and the uncertainties and limitations involving a particular site are identified.

Before actual construction can begin at a site, DOE must submit a site characterization plan to the NRC, the governor of the nominee state, the legislature of the state, the governing body of affected Indian tribes, and to the public. This plan is followed by a 3-month period for public comment and hearings. Site characterization will consist of construction of at least two

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exploratory shafts (based on initial drilling results) and the necessary surface and underground facilities.

At the Texas site, for example, shafts will be sunk using drill and blast techniques to between 2,600 and 3,000 feet, with subsurface facilities and ventilation tunnels extending out approximately 5,000 feet from the base of the shafts. DOE estimates that between 200 and 500 people will be employed at each site during peak site characterization activity. For sites not accepted as the permanent repository, the shafts will be filled and sealed.

Monitored Retrievable Storage

Incorporated into the NWPA is a provision for possible construction of a monitored retrievable storage (MRS) facility. Such a facility would provide interim storage (and possibly physical alteration) of spent fuel elements. As litigation and political problems delay the main thrust of the NWPA — a permanent high-level waste repository — the MRS option may become a temporary and partial solution to the high-level waste problem.

The NWPA calls for DOE to establish a federal program for siting and building an MRS facility by submitting a detailed proposal to Congress that shows site-specific designs and estimated costs of construction. This plan must include at least three alternative sites and an environmental assessment for each. In January 1986, DOE issued a proposal that identified three potential sites, all in Tennessee. The preferred site was at Oak Ridge, on the grounds of the planned Clinch River breeder reactor that was subsequently canceled.

Immediately upon DOE's issuance of the draft proposal, Tennessee filed suit in federal appeals court charging that DOE failed to properly notify the state of its siting decision. The court then issued an injunction preventing DOE from formally submitting its MRS proposal to Congress. In late November 1986, however, the appeals court ruled in favor of DOE, dissolving the injunction. Tennessee has filed for a stay of the decision pending a review by the full appeals court. Even if the Tennessee site selection is approved by Congress, however, Tennessee still has the same right of disapproval that applies to other site nominee states under the NWPA, exactly as if it were selected as a permanent repository site.

The highly publicized decision by DOE indefinitely to postpone siting work on the second permanent repository has refocused attention upon the MRS option. When presented with an MRS proposal, Congress has several options. It can approve the site as proposed by DOE; it can approve the MRS concept in lieu of an approved site; it can request selection of a different site; or it can simply take no action on the proposal.

According to a report compiled by the General Accounting Office (GAO), costs for the design, construction, operation and decommissioning of an MRS facility will probably exceed $3 billion. In political terms, the MRS seems to be assuming a larger and perhaps more acceptable role in government nuclear waste planning. Each obstacle placed in front of the permanent repository program, such as regional political struggles or lawsuits, makes the MRS a more viable intermediate option.

The Nuclear Waste Fund

The NWPA also provides a mechanism for funding part of the nuclear waste program. DOE is authorized to charge commercial reactor operators a fee of $0.001 per kilowatt hour for all electricity generated by nuclear power after April 7, 1983 (90 days after enactment of the NWPA). For electricity generated prior to the April 7 date, utilities pay a one-time fee, based on burnup and other considerations. Payment of these fees constitutes a legal contract. Under this contract the federal government agrees to take ownership of the spent fuel (and wastes derived from it) by 1998, the date specified in the Act for the completion of a repository.

To facilitate payment of the one-time fee on spent fuel generated before April 7, 1983, three options were made available to utility companies:

1. A single payment to be made by June 30, 1985.
2. Payment over 40 calendar quarters.
3. A single payment due January 1998.

In June 1985, 33 of the 47 utilities paid a total of $1.4 billion in one-time fees into the waste fund. The other 14 utilities elected to defer payment of $910 million, a sum which is expected to total $2.2 billion by 1998, including the interest due. By September 30, 1986, DOE had also collected $1.145 billion in fees for ongoing operations.

Recently, however, with extensions of several time limits written into the NWPA schedule, and the continuing legal obstructions to a repository, both utilities and the GAO have questioned DOE's ability to meet its scheduled commitment to take over the utilities' wastes by 1998. If that is the case, refunds to operators or other adjustments may have to be made to the Waste Fund.

Legal Challenges to the NWPA

From the beginning, observers have expected numerous lawsuits to be filed during the course of the NWPA's implementation. The complexity of the legislation, the large numbers of potential participants, and the increasing tendency for legislative decisions to be taken to the courts all increase the opportunities for judicial challenge to the NWPA. In addition, the nature of high-level nuclear waste creates a strong public sentiment over the location of disposal sites.

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The first round of lawsuits concerning the NWPA have challenged DOE's guidelines for site selection. The suits were filed in early 1985 by several states and environmental groups. A key issue has been that DOE has not properly taken into consideration NWPA requirements regarding transportation distances and proximity to waste sources. Other suits followed, claiming inadequate notification by DOE to the state of Texas of potentially acceptable sites; challenging DOE's funding of state activities concerning independent site characterization information at an early stage; charging inadequate time periods for public comment; and challenging environmental standards issued by the EPA for disposal and management of high-level radioactive wastes.

Recent Actions

On May 28, 1986, Energy Secretary Herrington announced that DOE's selection of three sites for characterization had been approved by President Reagan and that DOE was indefinitely postponing site selection work on the second geologic repository called for under the NWPA. This announcement created considerable political turmoil, particularly among authors of the NWPA and other members of Congress. Secretary Herrington stated that projections for quantities of waste materials were now considerably lower than those previously issued, and that work on a second site would be unnecessary for several years. The abandonment of the selection of a second site has been criticized as illegal and politically motivated. The NWPA contains no mechanism for the dropping of the second repository site. Rather, the Act specifically states:

"Not later than July 1, 1989, the Secretary shall nominate five sites, which shall include at least three additional sites not nominated under subparagraph (A) (the paragraph specifying the selection of the first repository), and recommend by such date to the President from such five nominated sites three candidate sites the Secretary determines suitable for site characterization for selection of the second repository." [Sec 112 (C)]

The NWPA limits the quantity of waste material in the first repository to 70,000 metric tons. The 70,000 tonne limit stipulated under the Act is purely statutory. It is not based on any scientific or technical grounds, but on estimates made in the early 1980s of high-level waste storage requirements of 65,000 metric tons by the year 2000. According to the secretary, that limit is unlikely to be reached until after the year 2020.

The selection of a site for the first repository, however, has turned into a political controversy, with positions being taken partially on the basis of an East-West division. Because the final three sites recommended to the president were all in the western half of the country — in Texas, Nevada, and Washington — while the great majority of nuclear plants are located in the East, the repository issue may further jeopardize a fragile political consensus.

Conclusion

Congressional confidence in DOE's administration of the waste program has diminished over the past several years, and that situation has been aggravated by Secretary Herrington's decision to discontinue site selection work on a second repository. In addition, the prominence of the nuclear waste issue during several recent elections in states affected by the site selections has added to the ever-greater politicization of the nuclear waste issue, adversely affecting the viability of NWPA programs. There has been much discussion in Congress about reducing the discretionary authority of DOE as program administrator, and about reopening the Act to amendments.

Several vital questions concerning the future of nuclear waste policy in the USA must be addressed if the NWPA is to accomplish its objective. One such question is whether DOE is the proper agency to administer a program that has become so politically controversial as the NWPA. The issue of regional equity, particularly between east and west, certainly must be answered. There are also questions about what kind of economic incentives might be offered to states to accept a waste site.

The progress of the NWPA toward a finished site is certain to be difficult, and further delays may be inevitable, given the political conflicts and potential legal obstacles that lie ahead. But at present the Nuclear Waste Policy Act is the most significant effort to address an issue vital to the US nuclear power industry.

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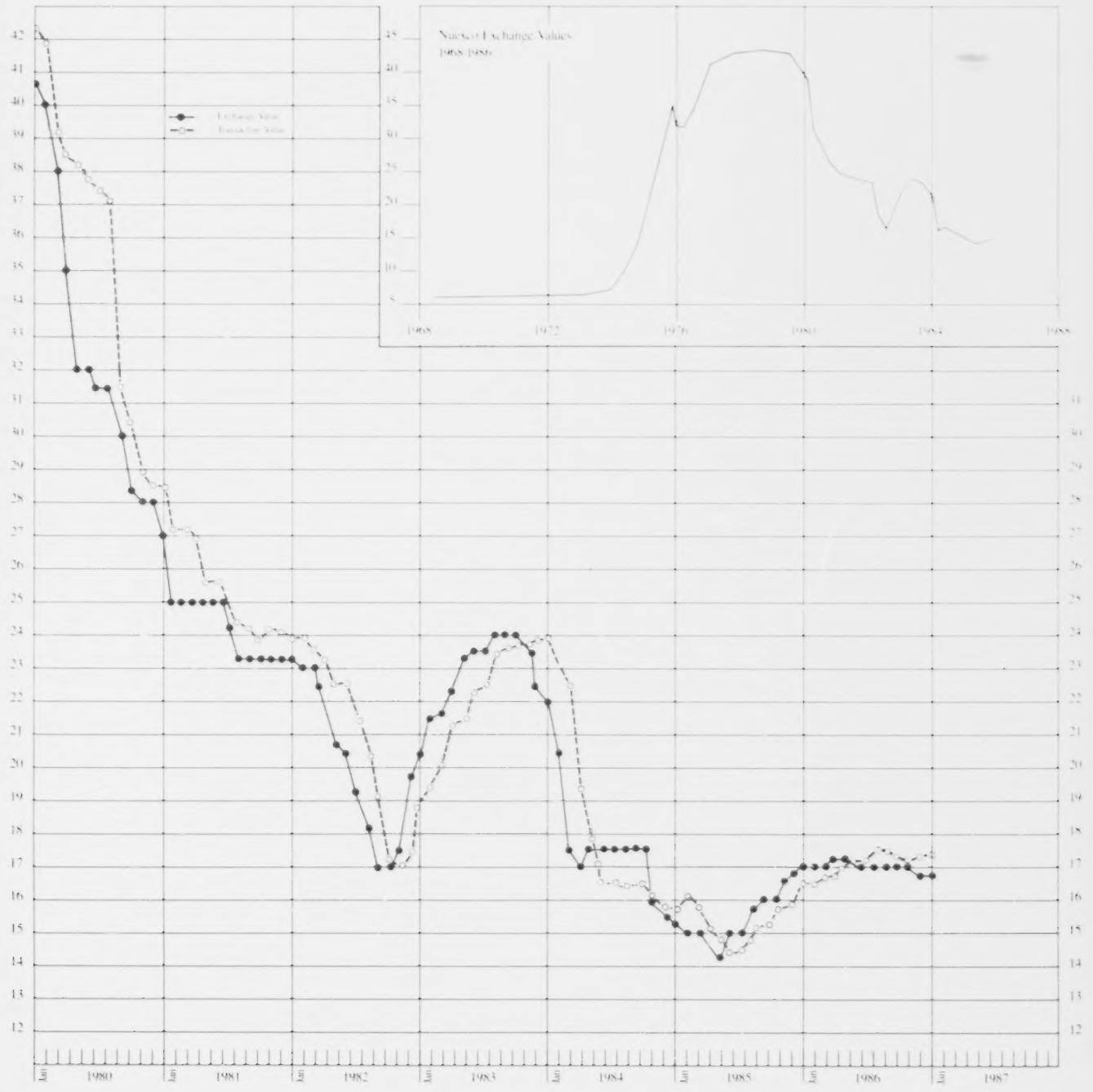
HISTORICAL MARKET DATA



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HISTORICAL EXCHANGE VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	20.25
1983	21.50	21.75	22.25	23.25	23.50	23.50	24.00	24.00	24.00	23.50	22.50	22.00
1984	20.50	17.50	17.00	17.75	17.75	17.50	17.50	17.50	17.50	16.00	15.50	15.25
1985	15.00	15.00	15.00	14.25	15.00	15.00	15.75	16.00	16.00	16.50	16.75	17.00
1986	17.00	17.00	17.25	17.25	17.00	17.00	17.00	17.00	17.00	17.00	16.75	**16.75**

HISTORICAL TRANSACTION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.60	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	18.80
1983	19.35	20.00	21.35	21.40	22.35	22.45	23.50	23.60	23.65	23.65	23.85	23.85
1984	23.05	22.50	19.25	17.90	17.00	16.50	16.60	16.40	16.55	16.05	15.90	15.90
1985	16.20	15.70	15.05	14.90	14.45	14.60	14.75	15.10	15.10	15.75	15.80	16.55
1986	16.55	16.70	16.70	17.10	17.15	17.20	17.50	17.45	17.35	17.25	17.30	**17.35**

HISTORICAL CONVERSION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U in UF_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981	1.20	1.20	1.20	1.40	1.15	1.15	1.15	1.10	1.10	1.10	1.20	1.20
1982	1.20	1.20	1.20	1.20	1.00	1.00	1.00	0.90	1.10	1.60	1.45	1.45
1983	1.20	1.40	1.40	1.20	1.20	1.20	1.10	1.10	1.00	0.60	0.60	0.60
1984	0.60	0.30	0.80	0.80	0.80	0.00	0.00	0.80	1.00	1.00	0.80	0.80
1985	1.00	1.00	1.00	1.50	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1986	1.60	1.80	1.80	1.90	1.80	1.80	1.80	1.90	1.90	1.90	1.80	**1.80**

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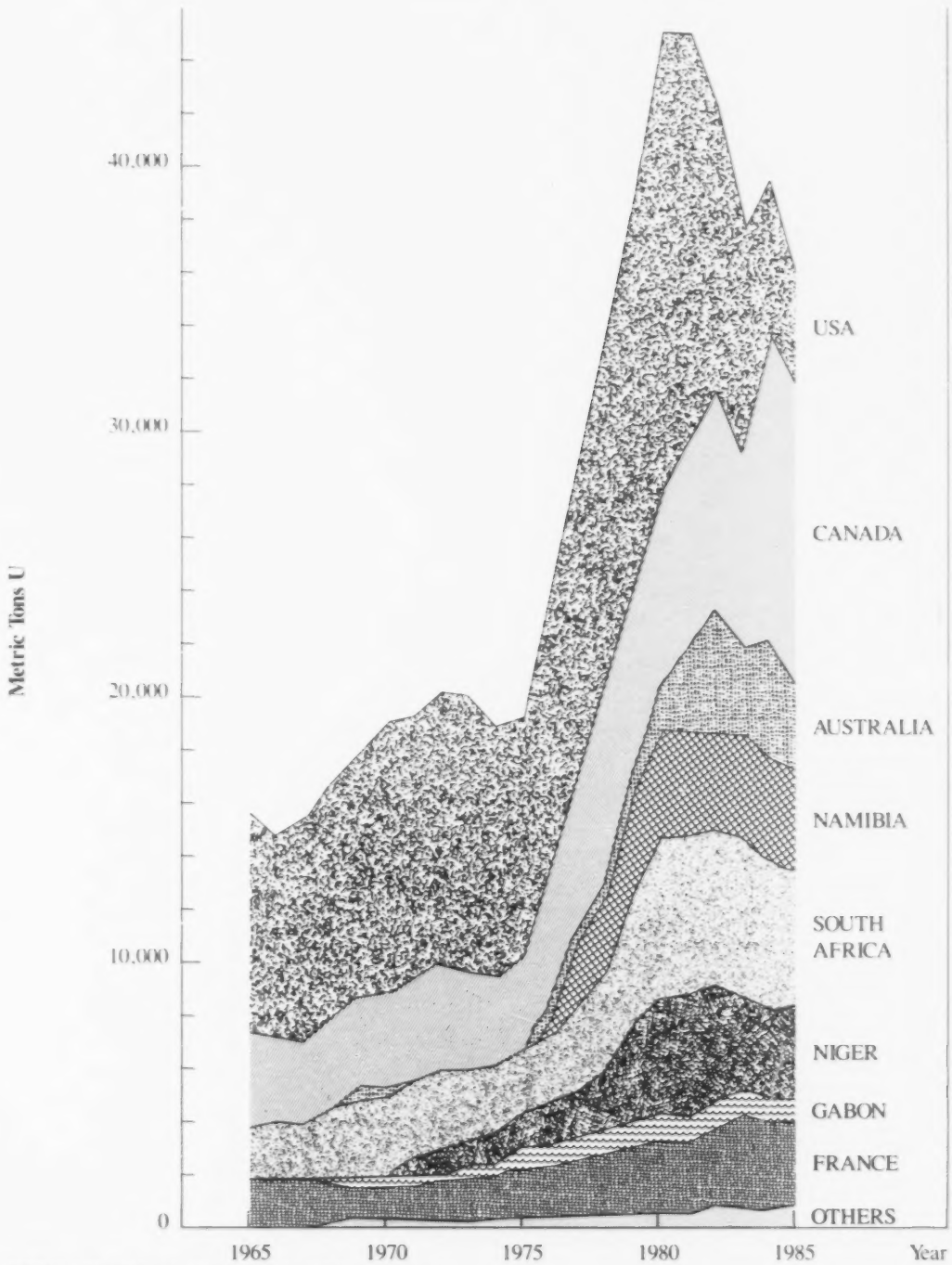
HISTORICAL MARKET DATA

HISTORICAL WOCA[1] URANIUM PRODUCTION[2]
(Compiled by OECD/IAEA Joint Report[3])



[1]WOCA = World Outside of Centrally-planned Economic Areas.
[2]1985 production data are preliminary.
[3]A joint report issued biennially by the OECD Nuclear Energy Agency and the International Atomic Energy Agency.

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US URANIUM MARKETING ACTIVITIES STATISTICS[1]
(Compiled from data published by the US Energy Information Administration)

Year	Volume of Deliveries to the EC[2] (in MTU)	Percentage of Deliveries Made Under Spot Contracts	Medium or Long-Term Contracts[3,4]		Spot Contracts[3,4]	
			Average Price in ECU per pound U_3O_8	Average Price in US Dollars per pound U_3O_8	Average Price in ECU per pound U_3O_8	Average Price in US Dollars per pound U_3O_8
1977	n/a	n/a	n/a	n/a	n/a	$41.00
1978	n/a	n/a	n/a	n/a	n/a	$43.00
1979	10,000	n/a	n/a	n/a	n/a	$44.50
1980	8,600	n/a	n/a	$36.00	n/a	$35.00
1981	13,000	less than 10	n/a	$33.25	n/a	$28.00
1982	12,500	less than 10	ECU 32.25	$32.00	ECU 24.25	$24.00
1983	13,500	less than 10	ECU 34.75	$31.00	ECU 26.00	$23.25
1984	11,000	less than 10	ECU 37.75	$29.75	ECU 24.50	$19.25
1985	11,000	11.5	ECU 38.00	$29.00	ECU 19.50	$15.00

[1]The twelve European Community member nations are Belgium, Denmark, France, the Federal Republic of Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and the United Kingdom; prior to January 1986, Spain and Portugal were not members of the EC.

[2]The only deliveries taken into account are those made to final users, namely the electric utilities or their procurement organizations; deliveries to middlemen or fuel cycle companies are not included. The sales between utilities in the Community are also excluded. The quantities covered are those which were entered into accounting records during the year stated.

[3]For deliveries made under medium or long-term contracts (i.e., for which the time between the date of signature and the date of the last delivery exceeds one year) the prices were expressed in seven different currencies. In order to calculate an average price, these prices have been converted into European Currency Units (ECU) and US dollars. The average prices were weighted by quantity and converted on the basis of the average annual exchange rate of the different currencies against the ECU and US dollar.

[4]Exchange rates as published by European Communities Statistical Office and the International Monetary Fund.

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HISTORICAL MARKET DATA

VOLUME AND PRICE OF URANIUM DELIVERIES TO THE EUROPEAN COMMUNITY[1]
(Compiled from data published by the Euratom Supply Agency)

Year	Total Production[2] (million pounds U_3O_8)	Deliveries to Domestic Utilities[3] (million pounds U_3O_8)	Average Price of Delivered Uranium ($/lb. U_3O_8)	Quantity of Uranium Imported[4] (million pounds U_3O_8)	Average Price of Imported Uranium ($/lb. U_3O_8)	Quantity of Uranium Exported (million pounds U_3O_8)
1976	25.5	n/a	n/a	3.6	n/a	1.2
1977	29.9	n/a	n/a	5.6	n/a	4.0
1978	37.0	n/a	n/a	5.2	n/a	6.8
1979	37.5	33.0[5]	$23.85[5]	3.0	n/a	6.2
1980	43.7	35.0[5]	$28.15[5]	3.6	$43.10	5.8
1981	38.5	32.6[5]	$34.65[5]	6.6	$32.90	4.4
1982	26.9	27.1	$38.37	17.1	$27.23[6]	6.2
1983	21.2	24.2	$38.21	8.2	$26.16	3.3
1984	14.9	22.5	$32.65	12.5	$21.86	2.2
1985	11.3	21.7	$31.43	11.7	$20.08	5.3

[1]Sources: 1979: US Department of Energy, Assistant Secretary for Resource Applications, Office of Uranium Resources and Enrichment, *Survey of United States Uranium Marketing Activity*, DOE/RA-0053 (Washington DC, July 1980); 1980-1981: US Department of Energy, Assistant Secretary for Nuclear Energy, Office of Uranium Enrichment and Assessment, *Survey of United States Uranium Marketing Activity*, DOE/NE-0013 and DOE/NE-0013-1 (Washington DC, June 1981 and July 1982); 1982: Energy Information Administration, *1982 Survey of United States Uranium Marketing Activity*, DOE/EIA-0403 (Washington DC, September 1983); 1983: Energy Information Administration, *Survey of United States Uranium Marketing Activity 1983*, DOE/EIA-0403(83) (Washington DC, August 1984); 1984: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1984); 1985: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1985).

[2]Sources: 1976-1982: US Department of Energy, Grand Junction Area Office, *Statistical Data of the Uranium Industry*, GJO-100 (Grand Junction, Colorado, January 1983); 1983: Calculated by the staff of the Nuclear and Alternate Fuels Division, Office of Coal, Nuclear, Electric and Alternate Fuels, Energy Information Administration, from US Department of Energy, Grand Junction Area Office data files; 1984: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1984); 1985: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1985).

[3]Excludes direct imports by domestic utilities.

[4]Includes imports by domestic utilities and domestic suppliers.

[5]Includes delivery commitments to domestic utilities and agents.

[6]Computation of quantity-weighted average price excludes the quantity associated with a large exchange (swap) transaction that occurred in 1982.

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AUSTRALIA

	Price Index of Materials Used in Manufacturing Industry — All Groups[1] (1984 = 100)	Award Rates of Pay Indexes Australia — Adult Males In Mining Wage Earners, Weekly Rates[2] (1976 = 100)
1975 Avg.	150.4	132.6
1976 Avg.	168.4	160.9
1977 Avg.	192.0	179.0
1978 Avg.[3,4]	198.5	190.0
1979 Avg.	248.8	127.9
1980 Avg.	321.8	140.8
1981 Avg.	355.3	154.1
1982 Avg.[5]	368.6	174.9
1983 Avg.	401.6	181.8
FY84 Avg.[6]	95.3	—
FY85 Avg.[6]	100.0	—
Jan 1985	97.0	197.8
Feb 1985	98.6	197.8
Mar 1985	102.1	197.8
Apr 1985	104.4	202.8
May 1985	107.6	202.4
Jun 1985	108.7	202.4
Jul 1985	111.1	202.4
Aug 1985	110.5	202.4
Sep 1985	108.7	202.5
Oct 1985	108.4	202.4
Nov 1985	109.4	209.9
Dec 1985	110.0	210.0
Jan 1986	109.6	210.0
Feb 1986	108.7	210.0
Mar 1986	99.5	210.5
Apr 1986	94.3	210.5
May 1986	93.5	210.5
Jun 1986	95.7	210.5
Jul 1986	98.1	215.2
Aug 1986	98.2	215.2
Sep 1986	105.6	215.3
Oct 1986	—	215.4

P = Preliminary R = Revised since last month

[1]Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0). The basis of this index was revised to 1984 = 100. The previous index was 1969 = 100.

[2]Australian Bureau of Statistics, Canberra: "Award Rates of Pay Indexes, Australia" (Catalogue No. 6312.0). Figures for the latest fourteen months shown are subject to revision.

[3]Monthly data for 1970-78 appear on pages 4.7 and 4.8 of Report 138.

[4]Annual averages prior to 1979 reflect index base no longer in use.

[5]Monthly data for 1979-82 appear on page 35 of Report 184.

[6]Annual averages are for financial year ending June 30.

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GOVERNMENT STATISTICS

CANADA

	Industry Selling Price Index: All Commodities[1] (1981 = 100)	Wage-earner Data: Average Hourly Earnings (C$)[2] Uranium Mines (SIC 057)	Metal Mines (SIC 051-059)	Mines, Quarries and Oil Wells[3] (SIC 051-099)	Primary Non-ferrous Metal Industries[4] (SIC 296)	(SIC 298)	Chemicals and Chemical Products[5] (SIC 372-379)
1979 Avg.[6]	217.9	—	9.60	9.66	—	—	7.67
1980 Avg.	247.2	—	10.58	10.80	—	—	8.50
1981 Avg.	288.7	—	12.02	12.23	—	—	9.53
1982 Avg.[7]	288.8	—	13.74	13.92	—	—	10.63
1983 Avg.	298.8	—	—	14.30	—	—	11.17
1984 Avg.	310.9	17.88	—	15.07	12.28	10.49	11.76
Jan 1985	117.5	18.05	16.13	15.60	12.32	10.80	12.04
Feb 1985	117.7	18.78	16.41	15.68	12.52	11.05	12.06
Mar 1985	118.4	18.24	16.21	15.57	12.44	10.97	12.02
Apr 1985	118.3	18.63	16.44	15.80	12.81	11.23	12.04
May 1985	118.6	19.41	16.51	15.63	12.76	11.25	12.15
Jun 1985	118.6	18.49	16.20	15.49	12.89	11.14	12.14
Jul 1985	118.6	18.14	16.27	15.41	12.96	11.17	12.13
Aug 1985	118.4	17.07	16.03	15.30	12.97	11.31	12.19
Sep 1985	118.6	18.53	16.55	15.72	12.95	11.39	12.26
Oct 1985	119.0	18.74	16.51	15.70	13.14	11.53	12.33
Nov 1985	119.3	19.05	16.66	15.88	12.76	11.32	12.49
Dec 1985	120.0	19.07	16.57	16.01	12.51	11.09	12.59
Jan 1986	121.0	18.15	16.22	15.86	13.11	11.48	12.52
Feb 1986	120.8	19.52	16.57	15.99	13.20	11.59	12.45
Mar 1986	120.1	19.04	16.65	15.93	13.11	11.59	12.54
Apr 1986	119.3	19.38	16.68	15.95	13.07	11.64	12.54
May 1986	118.4R	19.54	16.68	15.78	13.16	11.72	12.51
Jun 1986	118.6	19.80	16.63	15.64	13.44	11.86	12.49
Jul 1986	118.7	19.51	16.34	15.48	13.28	11.73	12.52
Aug 1986	119.1	18.39R	16.17R	15.46R	13.31R	11.31R	12.70R
Sep 1986	119.2R	19.32P	16.54P	15.73P	13.17P	11.48P	12.86P
Oct 1986	119.8P	—	—	—	—	—	—

P = Preliminary R = Revised since last month

[1]Statistics Canada, Prices Division, Ottawa: "Industry Price Indexes" (Catalogue 62-011). Indexes for the most recent six months shown are subject to revision. This category was formerly known as "Manufacturing." Index prior to 1985, 1971 = 100.

[2]Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa: "Employment, Earnings and Hours" (Catalogue 72-002).

[3]Reports 175 through 185 list this series title incorrectly as "Metal Mining, Including Milling (SIC 050-099)."

[4]Beginning with the April 1983 figure, Primary Metal Industries, non-ferrous is split into SIC 296 and SIC 298.

[5]Chemical and Chemical Products prior to April 1983 was SIC 370-379. The new series is from a new survey which includes all companies and is based on a 1970 classification. The old survey only included companies of 20 employees or more.

[6]Monthly ISPI for 1977 and 1978 appear on page 4.10 of Report 138, and monthly wage-earner data for 1973-78 appear on page 4.11 of Report 138.

[7]Monthly data for 1979-1982 appear on page 37 of Report 184. On that page, the wage earner index entitled "Metal Mining, Including Milling (SIC 050-099)" should read "Total Mining (SIC 051-099)."

[8]Beginning with the March 1983 figure, Wage Earner Data are based on a census of all companies employing 200 or more wage earners, *plus* a random survey of companies employing fewer than 200 wage earners. Prior to March 1983 only companies employing 200 or more wage earners are included in the Wage Earner Data.

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GOVERNMENT STATISTICS

REPUBLIC OF SOUTH AFRICA

		Average Declared Working Costs per Metric Ton of Gold Ore Milled (Rand)[1]	Tonnage-Weighted Index of Average Working Costs per Metric Ton of Gold Ore Milled (March 1982 = 100)[2]	Consumer Price Index[3] (1980 = 100)[4]	Producer Price Index All Groups[5] (1980 = 100)	Total Employment in Mining and Quarrying (Code 35)[6]	Total Salaries and Wages in Mining and Quarrying (1,000 Rand) (Code 40)[6]
1975	Avg.	16.71	—	157.2	100.0	639,473	1,003,617
1976	Avg.	19.30	—	174.7	115.1	671,240	1,212,983
1977	Avg.	23.87	—	194.4	130.0	712,006	1,420,670
1978	Avg.	27.14	—	137.2	142.7	664,571	1,537,169
1979	Avg.[7]	30.18	—	155.3	164.5	692,209	1,830,632
1980	Avg.[8]	35.53	—	176.7	192.1	714,379	2,279,615
1981	Avg.	41.89	—	206.5	218.3	728,506	2,820,505
1982	Avg.[9]	47.25	104.2	233.5	248.7	707,552	3,246,071
1983	Avg.	51.87	115.0	262.2	274.8	696,579	3,644,772
1984	Avg.	58.95	130.3	292.8	297.9	712,080	4,196,764
Jan	1985	—	—	177.1	166.6	711,366	376,777
Feb	1985	—	—	182.8	171.3	727,932	361,823
Mar	1985	64.48	142.4	183.6	173.0	708,809	371,380
Apr	1985	—	—	187.4	174.0	724,187	369,005
May	1985	—	—	189.5	177.7	708,085	373,478
Jun	1985	67.42	148.9	191.9	179.2	724,587	395,543
Jul	1985	—	—	193.6	180.7	738,228	419,106
Aug	1985	—	—	195.6	183.2	734,121	416,777
Sep	1985	70.47	155.3	197.8	184.8	732,836	419,883
Oct	1985	—	—	200.8	188.1	720,071	401,448
Nov	1985	—	—	203.4	196.0	750,049	432,996
Dec	1985	72.43	160.1	207.4	199.4	741,372	425,261
Jan	1986	—	—	213.8	203.6	744,070	449,513
Feb	1986	—	—	215.8	206.9	754,458	438,562
Mar	1986	75.76	167.8	218.3	206.9	759,897	445,387
Apr	1986	—	—	222.2	208.9	756,388	437,563
May	1986	—	—	222.6	212.5	754,788	425,544
Jun	1986	77.65	172.0	224.4	213.3	756,637	462,365
Jul	1986	—	—	228.8	216.3	756,140R	516,832R
Aug	1986	—	—	232.2	220.3	760,925	502,968
Sep	1986	81.94P	181.8	236.7	221.9	—	—
Oct	1986	—	—	239.3	—	—	—

P = Preliminary R = Revised since last month

[1]Chamber of Mines of South Africa, Johannesburg; "Analysis of Working Results," published quarterly.

[2]Page 16 of Report 178 contains description and calculation of index, and page 24 of Report 178 lists figures for 1982.

[3]Republic of South Africa Department of Statistics, Pretoria; "Government Gazette: Consumer Price Index for Urban Areas."

[4]The basis for calculation prior to January 1985, 1975 = 100. For annual averages prior to 1978, April 1970 = 100.

[5]Previously known as the Wholesale Price Index, now the Producer Price Index. The computation remains the same. The basis for calculation prior to January 1985, 1975 = 100.

[6]Bulletin of Statistics, Department of Statistics, Pretoria.

[7]Historical data for the Average Declared Working Costs and Consumer Price Index 1970-1979 appear on page 4.9 of Report 140.

[8]Monthly data for Codes 35 and 40, 1977-1980, appear on page 28 of Report 157.

[9]Monthly data for 1979-82 appear on page 39 of Report 184.

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GOVERNMENT STATISTICS

UNITED STATES

	Producer Price Index[1]		Consumer Price Index[2]	GNP Implicit Price Deflator[3,4]	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[5]			
	Industrial Commodities (1967 = 100)	All Commodities (1967 = 100)	(1967 = 100)	(1982 = 100)	Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
1980 Avg.[6]	274.8	268.8	246.8	178.64	10.26	10.63	8.30	6.94
1981 Avg.	304.1	293.4	272.4	195.51	11.55	11.98	9.12	7.62
1982 Avg.[7]	312.3	299.3	289.1	207.15	12.33	12.94	9.96	8.21
1983 Avg.	315.8	303.1	298.4	215.63	12.57	13.43	10.59	8.65
1984 Avg.	322.6	310.3	311.1	108.1	13.05	13.43	11.08	9.04
Jan 1985	322.9	309.5	316.1	—	13.29	13.70	11.39	9.33
Feb 1985	322.5	309.2	317.4	—	13.30	13.73	11.39	9.33
Mar 1985	322.6	308.7	318.8	110.4	13.29	13.95	11.37	9.39
Apr 1985	323.8	309.3	320.1	—	13.43	13.63	11.47	9.40
May 1985	325.3	309.8	321.3	—	13.24	13.60	11.44	9.39
Jun 1985	324.8	309.2	322.3	111.3	13.23	13.68	11.51	9.46
Jul 1985	324.4	309.0	322.8	—	13.45	13.83	11.59	9.47
Aug 1985	323.7	307.3	323.5	—	13.55	13.71	11.60	9.50
Sep 1985	322.3	305.5	324.5	112.1	13.44	13.68	11.65	9.54
Oct 1985	324.2	307.9	325.5	—	13.49	13.66	11.70	9.55
Nov 1985	324.7	309.5	326.6	—	13.49	13.97	11.80	9.61
Dec 1985	325.1	310.2	327.4	113.0	13.43	13.81	11.85	9.68
Jan 1986	323.8	308.9	328.4	—	13.40	13.69	11.86	9.60
Feb 1986	318.9	304.4	327.5	—	13.44	13.82	11.81	9.60
Mar 1986	314.0	300.3	326.0	113.5	13.38	13.93	11.78	9.62
Apr 1986	311.6	298.2	325.3	—	13.54	13.87	11.82	9.62
May 1986	311.6	299.2	326.3	—	13.46	13.79	11.89	9.64
Jun 1986	311.8	299.0	327.9	114.2	13.52	13.49	11.94	9.61
Jul 1986	308.5	297.4R	328.0	—	13.47	13.22	12.04	9.68
Aug 1986	307.7	297.2	328.6	—	13.04	13.18	11.99	9.67
Sep 1986	308.8	297.7	330.2	115.0	13.11R	13.41R	12.03R	9.73R
Oct 1986	309.3	298.3	330.5	—	12.88P	13.88P	12.08R	9.69R
Nov 1986	309.8	298.7	330.8	—	—	—	12.13P	9.78P

P = Preliminary R = Revised since last month

[1]US Bureau of Labor Statistics, Washington, D.C.: "Producer Prices and Price Indexes," (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents.

[2]US Bureau of Labor Statistics, Washington, D.C.: Consumer Price Index for All Urban Consumers, US City Average, All Items.

[3]US Department of Commerce, Washington, D.C.: Bureau of Economic Analysis, National Income and Wealth Division. "Survey of Current Business." The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted.

[4]The basis for calculation of this index was revised to 1982 = 100. 1984 and 1985 figures have been adjusted to that basis. The basis for calculation prior to 1984, 1972 = 100.

[5]US Bureau of Labor Statistics, Washington, D.C.: "Employment and Earnings." All data based on 1972 revision of SIC Manual. Data for 1970-1976 are adjusted to the March 1977 benchmark. Data for 1977-1978 are adjusted to the March 1979 benchmark. Data for January 1979 and beyond are adjusted to the March 1980 benchmark.

[6]Monthly data 1970-1978 for Producer Price Index-Industrial Commodities, Consumer Price Index, and Employment and Earnings SIC codes 10, 333, and 28, and quarterly data for GNP Implicit Price Deflator appear on pages 4.6-4.8 of Report 139.
Monthly data 1977-1978 for Employment and Earnings SIC Codes 10, 333, and 28 appear on page 33 of Report 147.
Monthly data 1970-1978 for Employment and Earnings SIC Code 36 appear on page 23 of Report 154.
Monthly data 1977-1980 for Producer Price Index-All Commodities, appear on page 21 of Nuexco Report 158.

[7]Monthly data 1979-1982 for all listed indices appear on page 41 of Report 184.

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